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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,412	03/01/2004	Baohua Chen	PS-102	2411

			EXAMINER
23933	7590	03/13/2006	MISIURA, BRIAN THOMAS

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ART UNIT	PAPER NUMBER
2112	

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/708,412	CHEN ET AL.
	Examiner	Art Unit	
	Brian T. Misiura	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _01 March 2004_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-20_ is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _11-20_ is/are allowed.

6)☒ Claim(s) _1,2,5 and 7_ is/are rejected.

7)☒ Claim(s) _3,4,6 and 8-10_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _01 March 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☐ All b)☐ Some * c)☐ None of:

  1.☐ Certified copies of the priority documents have been received.

  2.☐ Certified copies of the priority documents have been received in Application No. _____.

  3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _3/1/2004_.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

Specification

1.   The disclosure is objected to because of the following informalities: regarding the

first line of paragraph **[0019]**, the examiner suggests changing the word "desired" to

"desire". Also in paragraph **[0021]**, the word "and" should be changed to "an" in the

following sentence; "The pre-fetched data is then available for satisfying the current

read command if it continues to accept data over <u>and</u> extended burst." Appropriate

correction is required.

Claim Objections

2.   Claim 11 objected to because of the following informalities: the claim language

"and a discard counter that is advanced for each matching command that is discards

prefetched data in the cache;" appears to be missing words and or is written incorrectly.

The examiner understands the scope of the claim as it was explained in paragraph

[0029]. However, the applicant must amend the claim to correct the errors present.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly
claiming the subject matter which the applicant regards as his invention.

3.　　Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim language "substantially equal" renders the claim indefinite for failing to particularly point out a specific range.

The specification states the following: "Memory-read-line counter set 36 contains statistical counters that are used when the PCI master issues a memory-read-line command to read an entire line of bytes in the cache." – (paragraph 25); and "The memory-read-line command may read parts of two cache lines rather than just one cache line when the request is not exactly aligned to the cache line." – (paragraph 44)

The examiner interprets the memory-read-line command of paragraph 44 to read anywhere from a portion of 1 line, all the way up to and including 2 lines.

The examiner suggests the applicant amend the claim to read: "The PCI bridge of claim 6 wherein the read-line command reads an amount of data ranging from portions of 1 line in the cache buffer, up to 2 lines in the cache buffer." Or amend the specification to specify that if the read-line command is reading parts of two cache lines, that the total amount of data read will not exceed one 1 line of data. If the applicant chooses to amend the specification, the examiner also suggests amending the claim language "substantially" to "approximately".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148
USPQ 459 (1966), that are applied for establishing a background for determining
obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.

2.   Ascertaining the differences between the prior art and the claims at issue.

3.   Resolving the level of ordinary skill in the pertinent art.

4.   Considering objective evidence present in the application indicating
     obviousness or nonobviousness.

4.   Claims 1, 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable
over Melo et al. U.S. Patent No. 5,918,026 in view of Palmer U.S. Patent No. 5,305,389.

5. Per claim 1, Melo discloses: a Peripheral Component Interconnect (PCI) bridge
comprising:

- a first interface to a first PCI bus (Melo, figure 2 numeral **200**);

- a second interface to a second PCI bus (Melo, figure 2 numeral **202**);

- a cache buffer for storing data read from a PCI bus memory for a current command
  (Melo, column 5 line 66 – column 6 line 13, figure 2 numeral **208**);

- pre-fetch control means for fetching data from the PCI bus memory into the cache
  buffer for the current command (Melo, column 10 lines 5-24, figure 2),

- wherein the current command is a read command (column 9 lines 38-43) or a read-
  multiple command (Melo, column 9 line 56 – column 10 line 24, figure 2), the read
  multiple command able to read a larger amount of data than the read command;

- responsive when the current command is the read command (Melo, column 9 lines
  38-43) to read from the PCI bus memory (Melo, figure 1 numeral **124**) on the first
  PCI bus (Melo, figure 1 numeral **112**),

- responsive when the current command is the read-multiple command (Melo, column 9 line 56 – column 10 line 24, figure 2) to read from the PCI bus memory (Melo, figure 1 numeral **124**) on the first PCI bus (Melo, figure 1 numeral **112**)

Melo does not disclose the pre-fetch control means or statistical means.

However, Palmer discloses:

- the pre-fetch control means fetching a maximum amount of data determined by a pre-fetch count (Palmer, column 8 lines 31-53, figure 7C);
- statistical means, for generating the pre-fetch count for the read/read-multiple command by storing statistics indicating under-fetching and over-fetching of prior read/read-multiple commands; whereby separate pre-fetching statistics for the read command and for the read-multiple command generate the pre-fetch count (Palmer, column 8 lines 31-52).

-       It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to incorporate the teaching of Palmer into the system of Melo. The suggestion or motivation for doing so would have been to provide a method for making a prefetch routine more efficient by dynamically updating the prefetch count based on recent prefetches.

6.   Per claim 2, Melo discloses the use of read and read-multiple commands for prefetching (see generally column 5 line 6 – column 6 line 13 and column 9 line 36 – column 10 line 34)

Melo does not disclose the prefetch counting means.

However, Palmer discloses: first prefetch count means for generating a prefetch count, first under-prefetching count means for tracking read commands wherein the prefetch

control means under-prefetched data into the cache buffer; first over-prefetching count means for tracking read commands wherein the prefetch control means over-prefetched data into the cache buffer; first adjust means, coupled to the first prefetch count means, for increasing the prefetch count generated by the first prefetch count means in response to the first under-prefetching count means indicating that insufficient data was prefetched into the cache buffer in the prior read commands, and for decreasing the prefetch count generated by the first prefetch count means in response to the first over-prefetching count means indicating that unread data was prefetched into the cache buffer in the prior read commands (Palmer, column 8 lines 31-52)

-       It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to incorporate the teaching of Palmer into the system of Melo. The suggestion or motivation for doing so would have been to provide a method for making a prefetch routine more efficient by dynamically updating the prefetch count based on recent prefetches.

7.   Per claim 5, Melo discloses a memory-read-line command (column 10 lines 5-24, figure 1)

Melo does not disclose the statistical means for generating a prefetch count.

However, Palmer discloses: a statistical means, for generating the prefetch count for the command by storing statistics indicating under-fetching and over fetching of prior commands.

-       It would have been obvious to one having ordinary skill in the art at the time of the applicant's claimed invention to incorporate the teaching of Palmer into the system of Melo. The suggestion or motivation for doing so would have been to provide a method for making a prefetch routine more efficient by dynamically updating the prefetch count based on recent prefetches.

Allowable Subject Matter

8.   Claims 3, 4, 6, 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The primary reason for the allowance of claims 11-18 is the inclusion of the following limitations: first, second, and third counters for predicting the length of data to prefetch for a first, second, and third command; a disconnect counter that is advanced for each matching command that is disconnected by a bus slave; and the discard counter for counting each time a prefetched data is discarded from the cache. The primary reason for allowance for claims 19-20 is the inclusion of the following limitations: incrementing a read-disconnect counter when the read command is terminated by the bus slave before the bus master finishes reading data and no prefetched data for the read command in the cache is discarded; incrementing a read-multiple-completion counter upon completion of the read-multiple command; incrementing a read-multiple-discard counter when the read-multiple command is terminated by the bus master and prefetched data for the read-multiple command in a cache is discarded; and whereby prefetch length is separately predicted for the read command and the read-multiple command.
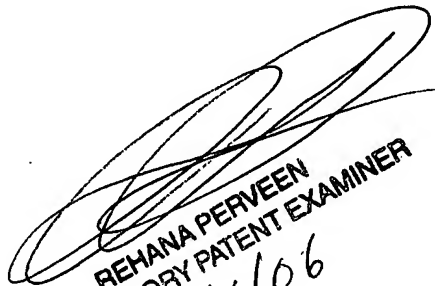
Therefore claims 11-20 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Brian T. Misiura whose telephone number is (571) 272-

0889. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Rehana Perveen can be reached on (571)272-3676. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

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Business Center (EBC) at 866-217-9197 (toll-free).

3/6/2006

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SUPERVISORY PATENT EXAMINER
3/6/06